The Builder.

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FOR some years past we have continued to point out the absurdity of building houses *as if to burn* (as is still the case),—houses so arranged that, if once on fire, there is little chance of staying the progress of combustion — houses, with hollow timber partitions, open from the top to the bottom, formed so as to introduce the flames, in the readiest possible way, to the joists and floor boards of each story and the timbers of the roof; and with staircases a mere bundle of sticks piled up from story to story, to make failure on the part of the partitions impossible. As we said, however, in an article on the subject at the beginning of the year 1845,* "the *application* of advice and moral precepts seems little regarded; 'thou art the man' must be whispered in our ears many times before we see the personal value of the lesson. That a similar event to that of which we have deplored the consequences in the family of another may happen to us, seldom enters our mind, or leads us to adopt preventive measures." The outlay for the latter is certain, though small; the danger, though great, is supposed to be doubtful, and the majority are willing to depend on the doubt.

In the volume from which we have quoted will be found a number of articles on the subject, urging the importance of rendering houses fire-proof as far as possible; rehearsing some of the principal plans which have at different times been proposed, and recording various suggestions forwarded to us by correspondents. It is to be regretted, that up to this time little or no improvement has taken place; repetition of the demand for proper precautions in the construction of buildings to prevent fire,—the neglect of which, indeed, amounts to positive *sin*,—continues therefore to be needful; but we venture to think arrangements are dawning which will conduce to a profitable change.

In the latter part of the last century Lord Stanhope (then Lord Mahon) proposed a plan to prevent fire, the main point in which was, filling the intervals between the joists that support the floor, with a rough plaster, laid on short pieces of lath, placed close together in a contrary direction to the joists,—in other words, "pugging" the floor, but with more care and completeness than is now usually done, with the intention only of preventing the passage of sound. Omitting mention of various unimportant projects, Mons. Louis Leconte, in 1841, with the same object in view, suggested an entire change in the mode of building, and obtained a patent for his plan. He proposed the use of frames, formed of cast-iron plates, set one upon another, in a substantial manner, to obtain the required height, and filled in with *concrete*. The main beams and cross beams of floor and roofs were to be of cast-iron, or iron and wood, having in the intervals between the beams iron rods, running in various directions, and supporting a metallic wire-work, as a foundation for the ceiling.

Others have proposed coating the underside of the joists with a mixture of alum, blacklead, clay, and lime, and covering them above with tiles, carefully jointed and bedded all round into the plastering of the walls,—contending, and with justice, that such a floor would long resist the action of flames.

Our esteemed friend, Mr. Loudon, whose memory we hold in sincere respect, saw clearly, what must be apparent to all who have thought upon the matter, that the two main points for consideration are to have incombustible staircases, and to avoid having any hollow partitions or floors.* He suggested, that when the partition could not be made entirely of brick, or brick-nogging, the interstices might be filled up with mortar prepared of clay, with a small proportion of lime. The same material, he said, might be filled in between the joists, and where it was desired to render the roof fire-proof, the rafters might be made of iron, or the space between wooden rafters might be filled in with this mortar. To render houses already built comparatively fire-proof, he suggested that all the interstices in the floors, partitions, and roofs might be filled in with an earthy powder, consisting of clay or loam mixed with a small proportion of Roman cement. That this should be injected by some description of pump or bellows which, while it forced in the powder, would permit the escape of air; and, while this was going on, that steam should be injected at the same time, so as to mix with the powder and be condensed by it; by which means the whole mass would be solidified with a minimum of moisture. "In short," says he again, "in rendering houses fire-proof, the next important object to using fire-proof materials is, that of having all the walls and partitions, and even the steps of wooden staircases, filled in with such materials as will render them in effect solid."

On examining into the causes of the rapidity of the spread of the flames in London houses when on fire, it will almost invariably be found, that, whatever may have occasioned the fire to break out, the rapidity of its progress has been in proportion to the greater or less extent of the lath and plaster partitions, the hollow wooden floors, and the wooden staircases. Were the occupiers of houses sufficiently aware of the danger from lath and plaster partitions, especially when they enclose staircases, they would never occupy such houses, or if they did, they would not give such rents for them, as they would for houses with bricknogging partitions.

Mr. Loudon goes on to say,—"Any building might be rendered completely fire-proof by avoiding the use of timber in everything except fittings-up and finishing. The floors might be formed of flat tiles and cement, and covered with ornamental tiles; or flooring may be made of composition, and polished in imitation of scagliola or artificial marble. The roofs might be made flat, and covered in a manner already described; and the outer walls might be tied together in all directions by wrought-iron rods made fast to stone bond as broad as the wall is thick,—the stone cramped or dovetailed together, and carried completely around the walls about the level of the centre of each floor. The netting or lattice-work of iron rods connected with this chain of stone bond, being thickly embedded in cement, and cased with strata of flat tiles, would be kept from extremes of temperature throughout the year,—so that the difference in their contraction and expansion, during summer and winter, would be of no practical importance. Every floor of a house thus formed would be, in effect, a single flag-stone; and as the iron rods would be prevented from oxidizing, it would probably last for ages. It is easy to conceive the skeleton of an entire house thus constructed,—the perpendicular supports being brick or stone piers, 3, 4, or 6 feet apart; the horizontal bond on these supports, of flag-stone of the width of the intended thickness of the wall or partitions; and all the horizontal floors or vertical panels of iron rods and wires, covered on one or both sides with plain tiles coated with cement. Even the staircases might be so constructed and covered."

In the beginning of 1645, Lieut. Higginson took out a patent for a system of construction wherein iron was substituted for wood. The system was this:—The joists of cast or rolled iron, T shaped, had at each end of any required length a dovetail projection, all of one size, fitting into flanched mortices on the iron girders and bonding sockets. The iron girders, of proportionate strength, were likewise ⊥ shaped, but reversed, having flanched dovetail mortices cast on each side of them, 1 foot or 16 inches apart, as necessary to receive the dovetail ends of the joists. The iron bonding sockets were of the size and shape of a brick, cut off angularly before, cone shaped, cast hollow; in the shorter side having a like dovetail mortice, to receive the joists. The short iron trimmer joists compassed the chimneys in the usual manner, fitting by dovetail ends into mortices cast on the principal trimmer, at one end, and into the bonding sockets built into the house wall beside the chimneys, at the other. The usual arch in support of the hearth being provided for by iron bearing-pieces, fitting in mortices between the short trimmer joists, with an iron plate to uphold the bed of mortar under the hearth-stone. The wells, or openings for staircases, were formed by iron trimmers, cast with dovetail mortices on them, to receive the joists. Additional means of support were to be provided, when requisite, by iron pillars, with a screw in the centre of the lower end, fitting into a screw socket, drilled into the trimmer beneath,—a tenon, or projecting piece, at the upper end of the pillar, entering a recess cast or drilled to receive it, in the trimmer of the floor above. Bressummers for shop fronts, gateways, or other purposes, were to be cast with the mortices for the joists inside, and trussing spans, to support great weights of superstructure, were likewise, when requisite, to be annexed.*

The inventor, however, got into difficulties, and the patent has not been worked.

Mr. Hosking, in his very useful "Guide to the proper Regulation of Buildings in Towns,"† has a chapter on the means of rendering buildings free from liability to take fire and burn, wherein he dwells at some length on the points above stated by Mr. Loudon, urging the abandonment of timber partitions, the importance of fire-proof stairs, and of ceilings sufficiently sound to defend the timbers from the flames. "Our in-door plastering upon laths is, for the most part, of the most fragile kind, and the slightest weight falling upon the back of a ceiling will too often make a breach through it; whilst our floors are commonly of deal laid upon fir joists, and are exposed to the action of fire from below, directly the lathed and plastered ceiling

* Vol. III. p. 260.

* "Encyclopædia of Cottage and Villa Architecture," p. 966.

* A fuller account of the system will be found in our third volume, p. 77.

† Murray, Albemarle-street.